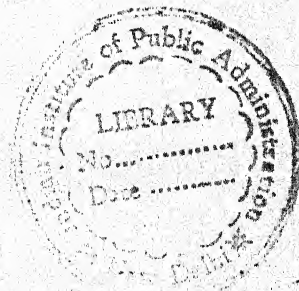


Economics of Different Classes of Service  
in Railways

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## CHAPTER I

### Introduction



# Economics of Different Classes of Services in Railways

## Chapter I

### INTRODUCTION

The Indian Railways are the nation's largest commercial enterprise with a capital at charge of over Rs. 3,500 crores. The Railways provide cheap transport for men and materials and thereby facilitate growth of the economy. Though in developed, advanced countries, rail transport, particularly in regard to passenger traffic, is progressively giving way to air and roadways, in India, Railways are the premier and extensive public transport system and will continue to play an important role in the nation's life.

1.2 As a public utility, Railways are charged with public service obligations. The public ownership of Railways places special responsibilities on them. The Indian Railways enjoy monopoly of rail transport. The object of a private monopoly happens to be profit maximisation but as a public sector monopoly, its objectives have to be maximisation of social benefits. The Railways have to function, with efficiency, economy and safety in such a way that the overall revenues are sufficient to meet over a course of time, combined charges of various types of operations. They must serve the largest number of people with the assets available to them while recovering costs of operation and maintenance.

1.3 It is generally recognised that pricing of the public sector must ensure revenue that equals the total cost of providing the service. The pricing policy in Railways should also be so evolved that it does not have an element of subsidy to the better-to-do sections of the society. In fact, on the general principles of a Welfare State, public utility services can resort to price discrimination, making higher profits on services which are used by richer sections and lesser (or may even subsidise) the services used by the poorest sections of the society. The rate structure should be so designed as to accomplish the following objectives:

1. Produce sufficient revenue to cover the cost of service etc.;
2. Maximise utilisation of fixed assets;
3. Assure stability of revenue;
4. Distribute the total cost of service reasonably among the different classes of customers; and
5. Promote an overall-general economic growth.

1.4 The designing of rate-structure of Railways calls for consideration of:

1. The costs and relative cost differences of supplying various classes of customers and/or services and
2. The demand characteristics of the different segments of the market served by the undertaking.

1.5 The demand price and the cost of service are the two extreme points within which the rate for a service has to be

(3)

fixed. Demand price is reflected when rates are fixed on the basis of the consideration 'what the traffic can bear'. It may be suggested that railway rates in India have been determined on the basis of these two considerations, viz. the demand price and the cost of service<sup>1</sup>, but the facts do not seem to be supporting such an impression.

1.6 Rate fixation for each service according to cost poses certain problems due to joint costs. Railways operate under joint cost conditions because a substantial portion of their facilities are used jointly - for goods traffic as well as for various classes of passenger traffic. Under such circumstances only a part of the total cost can be separated by identification with particular classes of customer services. There remains, however, a sizable proportion of total cost that is associated with all or much of the service provided and which is not identifiable with any specific service or class of customer.

1.7 Rate or fare-fixing according to the cost of service, needs cost analysis so that the average unit cost of providing service to the various classes of customers may be computed. Unfortunately, the Railways do not have a cost accounting system to find out the cost of operating a particular route or train service or the different classes of travel. This is a great lacuna in the working of a commercial enterprise.

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1. India, Report of Committee on Transport Policy and Coordination, p. 54

(4)

like railways. The Railway Convention Committee (1971) in its report opined, "the Railways as a commercial organisation of long standing should have worked out the cost of operation of various types of passenger services and shown the losses on various classes of travel separately to indicate a correct picture of their passenger operations class-wise" (Fourth Report, Part II, p. 58). In economic enterprise, price-fixing without ascertaining the cost of service or product is unbusiness-like. In the absence of such information, there cannot be rational fair-fixing for different classes of services. The Railway Convention Committee (1971) stated, "The committee (are) surprised that the railways are fixing fares for the various classes of travel without a scientific study of the expenditure on capital cost of the coaches and the expenditure on their operation and maintenance etc." (Ibid.) The Committee was told that, "The fares for the various classes of travel were fixed by Railways in old days roughly on the basis of the number of persons who could be accommodated in each class and the percentage of occupancy." (Ibid). This fare policy of the railways, perhaps, was valid at that time, but is no more valid today; it would appear/<sup>that</sup> it has tilted in favour of upper classes. This can be testified by putting it in the form of a model:



(5)

No. of Seats in a Coach	I 30*	III 80
Average occupancy	.5**	.9**
$(30 \times .5) = 15 : (80 \times .9) = 72$		

Space-occupancy Ratio 4.8 :

Fare Ratio 3.5 :

1.8 This does not take into account the qualitative aspect of the travel. A first class passenger enjoys facilities of cushioned seats, absence of over-crowding, better equipped bath rooms, smaller number of travellers per bath room, attendant's services, provision for night-sleep-berth without an extra charge, bed service on a charge of Rs. 5, secure and better waiting rooms, more courteous treatment from the Railway staff, etc. etc. In any model for fixing parity between these two classes, this qualitative aspect must be given due consideration. The model should be:

$$\frac{I \frac{C \times O}{Q}}{\frac{III \frac{C \times O}{Q}}{Q}} \quad C = \text{Seating capacity in a Coach}$$

O = Average Occupancy

Q = Qualitative Value of Service

If	C for 1	30	for	III	80
	O "	.5	"		.9
	Q "	2	"		1

Then the ratio of I and III class fares should be:

$$\frac{\frac{30 \times .5}{2}}{\frac{80 \times .9}{1}} = \frac{7.5}{72} \quad \text{or } 9.6 : 1,$$

\* Day time seating capacity is 36 and during night the capacity is reduced to 24 berths. Here an average is taken.

\*\* Overall occupancy as calculated later in this study.

if subjective value of the qualitative aspect of service for first class is given the value of only 2 and that for III 1.

1.9 If the Indian railways are to cater for the masses mainly, they must consider this aspect. The Convention Committee (1971) stated that, "They are of the firm view that travel in higher classes must pay its way", and suggested, "That the adjustment in fares particularly for higher classes should be done so as to meet fully the cost of operation thereof." The economics of operation of Indian Railways should be such as not to give undue preference in the form of subsidised provision of services to passengers of higher classes, belonging to a very small section of the society, and constituting only 1% of the total passengers originating.

1.10 Although the major share of revenue for the railways in India is derived from goods traffic, the contribution of passenger traffic is not inconsiderable. In 1971-72 the total earnings of the railways were Rs. 1101.7 crores, of which earnings from freight traffic were Rs. 675.3 crores (61%) and those from passenger traffic were Rs. 320.1 crores (29%) and the rest were from other miscellaneous services. Out of the total earnings derived from passenger traffic, more than 87% is received from III class travel alone. In 1971-72 the earnings from non-suburban passenger traffic amounted to Rs. 287.8 crores, of which Rs. 35.6 crores (12.4%) were from upper classes and Rs. 252.2 crores (87.6%) from III class. As against this, the number of coaches of the upper classes



is 18% of the total and the capital invested in these coaches is about 20% of the total capital invested in coaches. If we look at the figures in terms of passenger kilometers, we find 97.5% of them pertain to III class only. Less than 1% (0.94%) passengers travel in upper classes and 99.06% passengers travel in the III class. These facts indicate that for the convenience of less than 1% of the passengers, 20% of the total capital invested in coaches, and 18% of the total coaches in the Indian Railway system are used, while 99% of the passengers suffer from overcrowding etc.

1.11 The following table indicates the trend of number of seats and passenger kilo-meters for different classes for 1960-61 and 1971-72.

Class	Item	1960-61	1971-72	% Variation
ACC	No. of Seats	3111	2359	-24%
	Passenger km(Lakhs)	1100	1669	+52%
I	No. of seats	60492	90911	+50%
	Passenger Km(Lakhs)	14442	23373	+62%
III	No. of Seats	1149667	1347633	+17%
	Passenger Km(Lakhs)	625012	966695	+55%

1.12 The above figures indicate that for the third class the passenger kilometers have increased by 55% over a period of 11 years while number of seats have increased only <sup>by</sup> 17%, thus aggravating the over-crowding situation in III class further.

1.13 The trend for fares for different classes has been as follows during the last 7 years

Class	Fares for 500 Km. in rupees as on					
	1.4.55	Index	1.4.60	Index	15.4.72	Index
I	52.08	100	55.25	106	117.60	225
II	24.41	100	25.90	106	57.25	234
II M/E	15.46	100	17.20	111	33.60	217
II Ord.	13.83	100	14.60	105	28.60	206
III M/E	8.14	100	9.75	119	17.15	218
III Ord.	7.32	100	8.10	110	13.15	179

1.14 Evidently, during the last seven years, the rates in upper classes have increased at a little faster rate than in third class as a result of which the proportion of upper class fares as compared to third class have increased. The present first class fare for 500 kilometers is more than four times the third class ordinary fare and about three times that of third class Mail/Express fare. This compares with the present seating capacity of coaches in these classes. While 24 passengers at night and 36 during day time can be accommodated in a first class coach, the seating capacity in a third class coach is about 80. Apparently, without considering overcrowding in III class, less occupancy in I class and various comforts provided in travel and out of travel to that class, it gives us an impression that first class fare is placed at a higher level and must be generating surplus for third class travel. This would probably be true if the

the following two conditions were satisfied.

- (1) The total cost of hauling an upper class coach and a third class coach is same.
- (2) The utilization of upper class coaches is same as that of third class coaches.

How far these two assumptions, which form the implicit basis of the fare policy of Indian Railways is true is what we are attempting to answer in this study.

Trend of Passenger Kilometer and Seats  
(First Class)

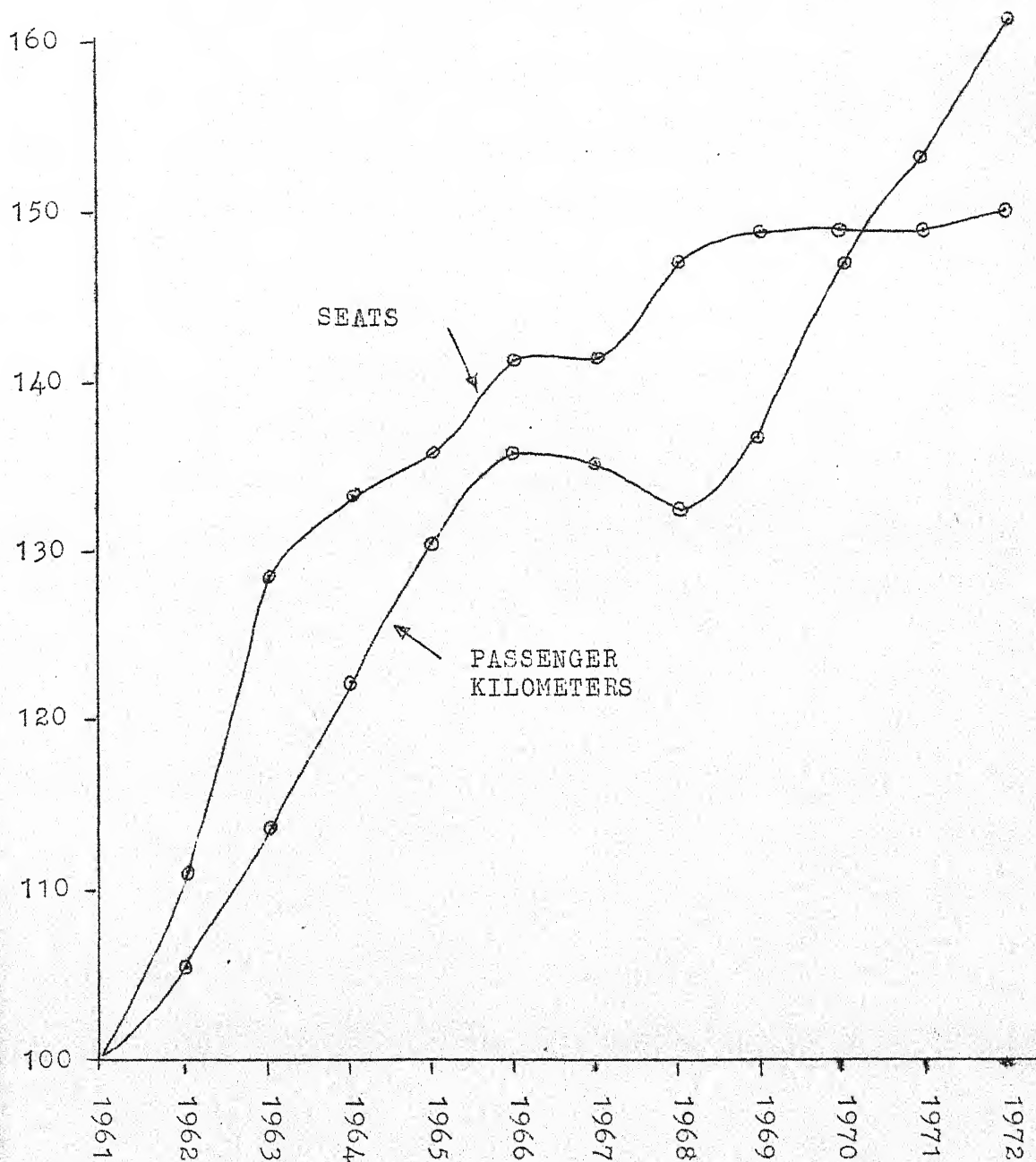


Figure 1

(11)

Trend of Passenger Kilometer and Seats  
(Third Class)

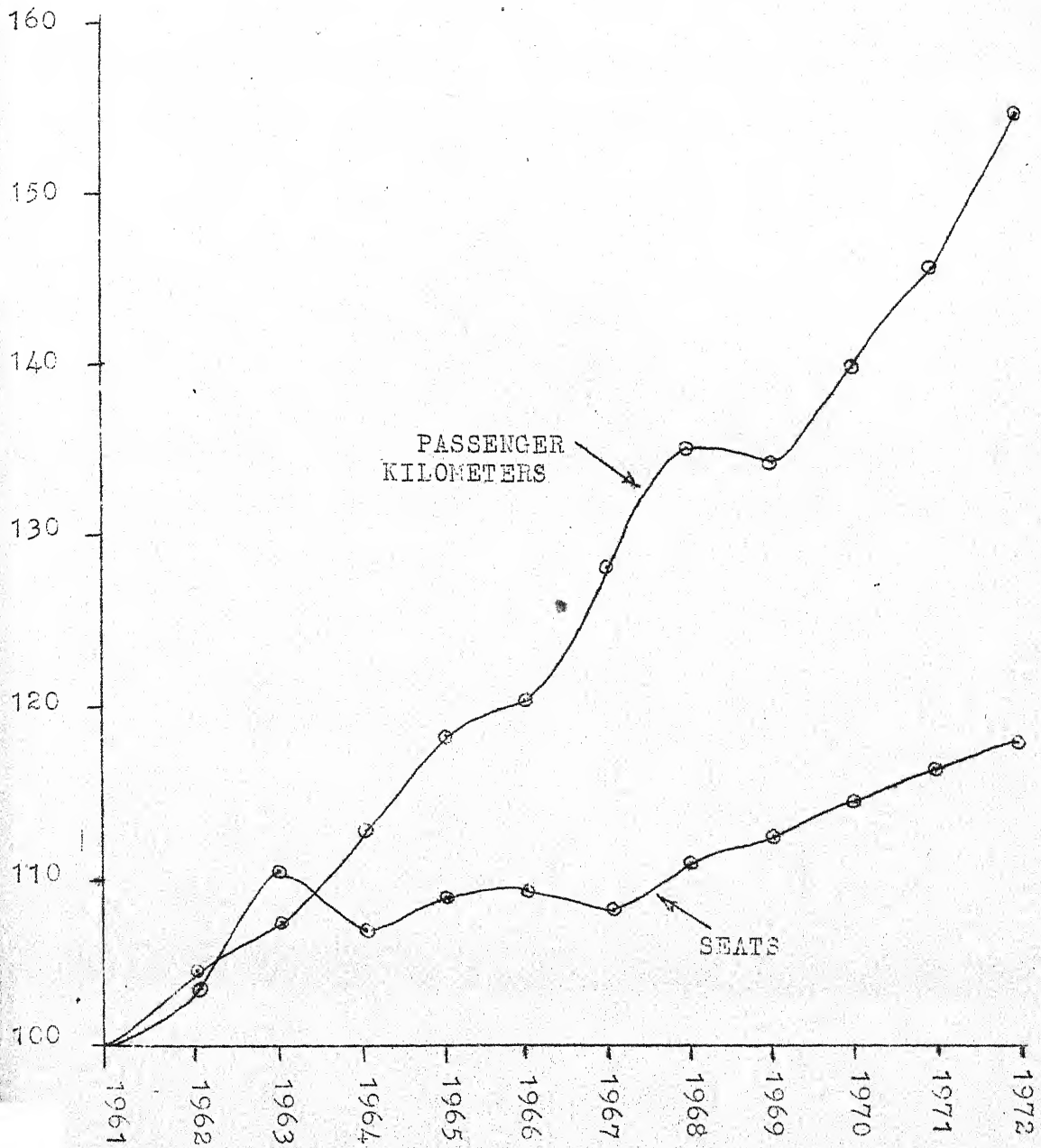


Figure 2

## CHAPTER II

### Provision of Different Services - Trends



Chapter IIPROVISION OF DIFFERENT SERVICES-TRENDS

During 1960-61, Railways had a provision of 0.6 lakh seats in First Class and about 11.5 lakhs in third class. The utilization of these seats can be judged by the total passenger kilometers travelled during the year 1960-61 per seat in each of these classes, which was 23,874 for each first class seat and 54,364 for each third class seat. The total kilometer travelled per seat during the year is not available but the utilization of a first class seat was less than 50%.

2.2 The trend of demand in terms of passenger kilometers and the provision of seats from 1960-61 to 1971-72 taking 1960-61 as the base year is shown in Table 1. It is evident from the Table that the provision of seats in first class has been expanding at a faster rate than the demand during the first eight years, thus investing a large amount of capital in first class coaches, improving the service to the first class passenger and bringing down the average utilization of a first class seat to below 2,200. This growth in the number of seats has been rather marginal during the remaining three years improving the utilization to 25,709 during 1971-72.

2.3 Table 2 shows the growth of demand and supply in the third class from 1960-61 to 1971-72. While the demand in terms of passenger kilometers has increased by about 55% during the period, the corresponding increase in the number

of seats during the same period was only about 17% thus increasing the utilization of seats from 54,364 passenger kilometers in 1960-61 (more than double that of first class) to an all time high figure of 71,732.

2.4 Evidently the second assumption in the fare policy about the utilization of seats or coaches of different classes has been stretched farther from the reality by disproportionately increasing the services in the first class. The utilization of a third class seat during 1971-72 is about three times that of a first class seat.

2.5 The first assumption about the total cost of haulage of a coach of different classes, also, is obviously not true. Anybody travelling by Indian Railways would be aware of the disparity of services in different classes.

CHAPTER III

Economics of Different Classes

Chapter IIIECONOMICS OF DIFFERENT CLASSES

As mentioned earlier, Railways do not have a system for estimating the cost of passenger travel in different classes. Even the data base for such an analysis does not exist. The Railways incur expenses on different accounts, viz., Maintenance of structural works, which includes rail lines, bridges, buildings and other structural works, maintenance and supply of locomotive power, maintenance of carriage and wagon stock, expenses of traffic, general, electrical, signal and telecommunication departments, etc. A major portion of these expenses, i.e., maintenance of structural works, is not incurred on any particular class of travel. The same rail line is used for the transportation of goods, passengers of different classes and other services provided by Railways and the expenses incurred on its maintenance cannot be debited to any of these services separately. The same is true for the maintenance of bridges, station buildings, signals etc. However, some of these expenses like maintenance of carriage and wagon stock and the expenses of electrical maintenance can be said to have been incurred for a particular class of service, because the services provided in coaches of different classes are different. There are some other services like waiting room, provision of beddings in air-conditioned coaches, provision of an attendant in AC and I Class coaches, which are provided for a particular class. The present accounting

system of railways does not allow for the calculation of actual expenses incurred on these services.

3.2 The Railways have, for accounting purposes, been allocating total expenditure incurred on common services on a basis evolved by them to goods and coaching traffic. The Railways, however, have not so far evolved any basis for allocation of expenses related to coaches between passenger and other coaches and between different classes of passenger coaches. Even some of the expenses incurred on specific services like maintenance of coaches, electrical expenses, and on waiting room are not accounted separately. This makes it impossible to know class-wise expenses. Similarly, it is not possible to work out the expenses incurred on different routes or trains or to have a break up between main lines and branch lines.

3.3 However, during discussions with the railway officials, it was found that they are making attempts to work out the expenses class-wise by evolving objective criterion for the allocation of different expenses to different classes. They have already started conducting some sample surveys for this purpose but they are still on a preliminary stage in this direction.

3.4 With the present data base, it is rather difficult to calculate the cost of travel by different classes in very precise manner. However, we have tried to evolve certain criterion for the allocation of different expenses to these

classes, within reasonable limits of accuracy for the purpose of an economic analysis of different classes of travel. Some sample surveys were conducted for this purpose. But, more reliance has been made on the data published by the Railway Board.

### Variable Expenses

3.5 The expenses which are incurred for a specific class are referred to as variable expenses. We have tried to estimate these expenses separately for each class. The basis is as follows:

- (1) Depreciation on coach: This should normally be proportional to the capital cost of the coach depending on the life period. The life of a coach as specified by Railway Board is 30 years. The railways charge depreciation at the rate of  $4\frac{1}{3}\%$  per annum on the capital, so, a depreciation of  $4\frac{1}{3}\%$  has been allowed on the capital cost of the coach. The air-conditioning equipment attached in the air-conditioned coach has a life of only 12 years. Considering this fact the depreciation on air-conditioning equipment has been calculated separately at the rate of  $12\frac{1}{3}\%$ . The capital cost of coaches of different classes, according to the information provided by the Railway Board is 3.0 lakhs for an A.C. Coach and 2.0 lakhs for its air-conditioning equipment, 2.65 lakhs for a I class coach,, 2.10 lakhs for a II class and 2.30 lakhs for a III class coach.



- (ii) Interest on Capital: This has been taken as 6% on the total capital cost of each coach.
- (iii) Repair and Maintenance(Mechanical): Railways publish the average cost incurred under this head for each coach. We have, on this basis, worked out the total cost incurred, on this account, on all the passenger coaches and have distributed this cost amongst the coaches of different classes proportional to their capital cost.
- (iv) Electrical Expenses: The figures for electrical expenses incurred per coach for lighting and air-conditioning purposes has been supplied to us separately by the Senior Electrical Engineer of Northern Railways based on the actual expenses incurred by them. We have assumed the expenses for lighting purposes uniformly for I, II and III class coaches.
- (v) Cost of Attendant: The average salary and benefits of an attendant provided in A.C. and I Class coaches, according to information provided to us, amount to Rs. 280 p.m. We have assumed one attendant for each A.C. and I class coach and worked out his annual cost on that basis.
- (vi) Cost of Bedding: Every passenger travelling by an A.C. coach is provided with bedding for which no extra charges are made. An average A.C. passenger travels 569 kilometers and we assume that he makes use of this bedding. The same service, if provided to a

I class passenger, is charged for at the rate of Rs. 5. We assume this as the basis of our costing and have provided Rs. 5 for each passenger travelling in A.C. The number of passengers originating is published by the Railways and we have worked out the total number of coaches by dividing the total number of seats by seats per coach published by the Railways. On this basis we have worked out the cost of providing beddings per A.C. coach per year.

#### Common Expenses

3.6 All other expenses incurred on passenger travel which have not been considered in the variable expenses have been referred to here as Common Expenses. We know some of these expenses are not really common viz. those incurred on waiting rooms, ticket windows etc. But they are either insignificant or we have not been able to evolve any criteria to allocate them separately. We assume them here as some sort of common expenses.

3.7 The common expenses are expenses like those incurred on maintenance of rail lines, structural works, maintenance and supply of locomotive power etc. which are not incurred for any particular class of travel but provide common services to all the classes of passenger services apart from goods and other services. The only basis that seems to us reasonable for the allocation of such expenses is on the basis of the proportion of the capacity consumed by each service.

3.8 A specific number of trains can be run on each track. This is called the track capacity. The capacity of each train is determined by the horse power of the locomotive engine. The horse power consumed by each coach is proportional to the weight of each coach apart from the power consumed by the generating set attached to it for the purposes of lighting and air-conditioning. We have tried to convert this power consumed by the generating set into the equivalent weight under average conditions. By adding this equivalent weight and the weight of the passengers and luggage allowed to the tare weight of the coach, we have worked out the total effective weight of a coach of each class. This total effective weight, we have taken as the basis of allocating the common expenses.

#### Equivalent Weight of Generator Power Under Average Conditions

3.9 We know that a locomotive engine of 2400 H.P. under normal conditions, carries on rails a weight of about 800 Tonnes. So, one Tonne can be assumed to consume 3 H.P. of engine power. The generating sets used in ordinary coaches are of 3 KW and consume 4.5 H.P. at 90% efficiency, those used on air-conditioned coaches are of 18 KW and consume 27 H.P. This has been converted to an equivalent of 1.5 and 9 Tonnes respectively.

#### Weight of Passengers and Luggage Allowed

3.10 From the figures of seat kilometers supplied by Railway Board and passenger kilometers published by them for 1971-72 we have worked out the average occupancy ratio per seat. For the number of seats in a coach we have worked out the average number of passenger per coach. Assuming a weight of 60 Kg.

for an average man and assuming he carries the maximum luggage allowed to him in each class, we have worked out the weight of passengers and luggage.

#### Total Common Expenses on Passenger Coaches

3.11 The total revenue expenses incurred by Railways during 1971-72 have been divided between goods and coaches by them. For this purpose, coaches include passenger coaches and also other coaches. We have pro-rata divided those expenses into passenger and other coaching depending on number of coaches in each. This may not be very justified because the expenses on passenger coaches and other coaches may be significantly different. But, as we are interested only in the class wise comparison and not in the exact cost of travel, this will not affect our results in any significant way. Out of the total common expenses on passenger coaches so obtained, we have subtracted the total variable expenses worked out earlier. This gives us the total common expenses on passenger coaches.

#### Allocation of Common Expenses Class-wise

3.12 The total number of seats in each class is published by Railways. We have divided these number of seats by the number of seats per coach in each class to get the equivalent number of coaches in each class. The exact number of coaches in each class is not available because there are some composite coaches. To these equivalent number of coaches, we have divided the total common expenses proportional to the total effective weight of a coach in each class.

Total Expenses Per Coach

3.13 By adding the variable expenses and the common expenses for each coach, we have worked out the total expenses per coach during 1971-72 for each class.

Cost and Revenue Per Passenger

3.14 We have the total passenger kilometers for the year for each class and equivalent number of coaches for each class. By dividing the two, we get average passenger kilometers travelled per coach. By dividing the total expenses per coach with the passenger kilometers per coach, we get the average cost per passenger kilometer. The average number of kilometer travelled by a passenger in each class is again published. We have worked out the cost for these average kilometers per passenger in each class and from the fare table the fare charged for these average kilometers in each class. The difference of cost and revenue gives the surplus or deficit for each class.



## CHAPTER IV

### Conclusions and Suggestions



Chapter IVCONCLUSIONS

If we look at the cost and revenue per passenger figures, it appears that an average A.C. passenger travelling 569 kilometers pays Rs. 135.45 while only Rs. 113.63 is spent on him. So, he generates a surplus of Rs. 21.82 for Railways. Similarly an average I class passenger travelling 418 kilometers pays only Rs. 49.35 while Rs. 57.93 are spent on him thus creating a deficit of Rs. 8.58. An average II class Mail/Express passenger travelling 371 kilometer pays Rs. 26.25 against Rs. 26.56 as the expenditure on him creating a deficit of Rs. 0.31. An average II class ordinary passenger travels only 61 kilometers and pays Rs. 5.25 against Rs. 4.37 spent on him making a surplus of Rs. 0.88. Similarly an average III class Mail/Express passenger travels 261 kilometers and pays Rs. 9.55 against the expenditure of Rs. 6.13 leaving a surplus of Rs. 3.43. An average III class ordinary passenger travels only 53 kilometers and pays Rs. 1.60 against Rs. 1.25 spent on him leaving a surplus of Rs. 0.35.

4.2 These figures pertain only to broad gauge travel and we have not made any analysis for the meter gauge and narrow gauge travel. We have only worked out the all-India average broad gauge cost and have not tried to make any route wise or train wise comparison. Thus, it would not be proper for us to comment on the comparative figures for Mail/Express and Ordinary travel.

4.3 The cost worked out for each class may not be very exact and may slightly vary on either side from the actual cost. But, still it gives us a clear comparative picture of different classes. It looks obvious that Railways are making maximum surplus from III class travel and making loss on I class travel. This is evidently not because of more expenditure on a I class coach than on a III class coach because per coach expenses work out to be almost the same viz. Rs. 1,68,691 for a I class coach against Rs. 1,68,015 for a III class coach. Even if we allow for some error in these figures, the expenses per I class coach cannot be considerably less than those on a III class coach. In fact, they would be more because some of the variable expenses like those on waiting rooms, priority for retiring rooms, ticket windows and such other differential services to I class passengers could not be estimated separately. Then the deficit in I class travel is due to a very low occupancy in these coaches. A I class coach has a day capacity of 36 seats and the night capacity of 24 seats against 75 to 80 seats in a reserved III class coach. Out of this small capacity in I class coach, only about 46% is actually utilized. Obviously this results in very heavy expenses per passenger.

#### Cost of Reservation

4.4 Apart from working out the economics of the cost of travel in different classes we have tried to work out the cost of making a reservation in upper and lower classes at Delhi and New Delhi reservation counters. This has been done on the basis of actual expenses during 1972 on staff, telephones,

telux etc. and assuming 40% overheads to account for maintenance of buildings, supervision etc. The comparison of this cost with the charges made in upper and lower classes show that the charges in the upper classes are not meeting the cost and is being subsidized.

Comparative revenue from AC, I and III Class-Coaches:  
on Main Routes

4.5 The per coach revenue from third class trunk routes, Mail/Express trains is more than AC or I class, if occupancy, as revealed by the censuses taken by Railways and number of seats provided in the coach are taken into account.

4.6 Percentage of occupation of unreserved seats in third class for 11 broad gauge routes varies from 112% to 186% (Railway Convention Committee - 1971, Fourth Report, Part II, p. 20). Out of these 11 routes, in 6 occupancy was more than 150%. The average occupancy for all the 11 routes comes to nearly 150%. In first class the occupancy is on an average about 75% and in AC class it is 52% to 60%. If we calculate total revenue for a coach in respect of AC, I and III reserved (3 tier) and III unreserved in a mail/express train from Delhi to Bombay, the results would be:-

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	AC	I	<u>III</u> 3-tier	<u>Unreserved</u> seats
Fare from Delhi to Bombay (Rs.)	282.45	134.40	38.80 4.00*	38.80
Seating/berth capacity in a coach	18	24	75	80
Occupancy	67%	75%	100%	150%
Seats fares received	12	18	75	120
Less 5% for ticketless travel	-	-	-	6
Net Seats	12	18	75	114
Net revenue per Rs. coach	3389.40	2419.20	2910.00 300.00	4425.20
			<u>3210.00</u>	

\* Rs. 4 per berth for a night

4.7 Irrespective of comforts provided to AC and I class in travel as well as out of travel, which increase the cost of operation, higher cost of coaches etc. the III class coach (unreserved accommodation) brings, more revenue as compared to AC or I class coach. The total revenue of III class (reserved) is more than that of I class coach. Even if I class coach is fully occupied, the revenue would be Rs. 3225.60 which is equal to a 3 tier-III class coach or 25% less than the III class unreserved coach. It shows that the marginal revenue from a III class coach would be much more than that of AC or I class one.



SUGGESTIONS

4-8 Keeping in view the overall objective of service to the masses, the following may be suggested on the basis of our analysis:

1. The railways should develop a cost accounting system that can help in finding out the cost of different classes of services and different routes.
2. Though the overall occupancy of the passenger traffic provided is nearly 90% for III class and 50% for first class, there is over-crowding in III class on the main routes, it indicates much less occupancy ratio on branch lines. The railways should undertake traffic surveys to find out as to where the service needs expansion and where it is excessively provided. Without further capital investment in the coaches, the diversion of coaches from routes which are under-traffic to over-traffic routes, will help a lot in the improvement of services.
3. On main routes, the railways should try to find out, as to whether adding an additional coach of I class or III class brings more marginal revenue. If there is not substantial differences, III class coaches should be provided so as to improve the services for III class passengers.
4. To improve upon the occupancy of I class coaches and remove over-crowding in III class, the railways should, in future, not add any further coach of I class. The coaches for III class passengers should be added to meet the increasing demand, wherever it is.

## TABLES

Table I

Trend Showing Passenger Kilometers and No. of Seats from 1960-72

(All India Non-Metropolitan)

Year	A C C		I		Passenger Km. (in 000)	No. of Seats	Passenger Km. (in 000)	No. of Seats	III
	Passenger Km. (in 000)	No. of Seats							
1960-61	109,983	3,111	1,444,174	60,492	62,501,244	1,140,667			
1961-62	116,584	3,107	1,521,689	67,023	65,176,819	1,188,222			
1962-63	130,651	3,006	1,638,323	77,672	66,905,466	1,267,154			
1963-64	138,642	2,983	1,764,270	80,584	70,350,521	1,224,967			
1964-65	143,489	3,014	1,883,677	82,211	73,710,639	1,247,774			
1965-66	146,358	2,404	1,961,293	85,508	74,978,210	1,251,045			
1966-67	150,658	2,370	1,954,528	85,508	79,785,501	1,237,456			
1967-68	152,541	2,484	1,912,273	89,045	84,260,445	1,267,632			
1968-69	134,508	2,509	1,977,279	90,261	83,663,283	1,237,926			
1969-70	146,082	2,477	2,126,233	90,235	87,161,534	1,309,133			
1970-71	174,652	2,399	2,213,551	90,256	90,961,290	1,330,213			
1971-72	166,930	2,359	2,337,341	90,911	96,669,474	1,347,633			

Table 2

Index of Passenger Kilometers and Seats for I and III class  
from 1960-61 to 1971-72 with 1960-61 as the base year

	I		III	
	Passenger Kilometers	Seats	Passenger Kilometers	Seats
1960-61	100.00	100.00	100.00	100.00
1961-62	105.3	110.3	104.3	103.4
1962-63	113.4	128.4	107.0	110.2
1963-64	122.1	133.2	112.6	106.5
1964-65	130.4	137.9	117.9	108.5
1965-66	135.8	141.4	120.0	108.8
1966-67	135.3	141.4	127.7	107.6
1967-68	122.4	147.2	134.8	110.3
1968-69	136.9	149.2	133.9	112.0
1969-70	147.2	149.2	139.5	113.9
1970-71	153.3	149.2	145.5	115.7
1971-72	161.8	150.3	154.7	117.2



Table 3.

Statistics Showing Demand and Provision for different Classes in  
1960-61 and 1971-72

Class	Item	1960-61	1971-72	% increase.
AC.	No. of Seats (NS)	3111	2359	- 24%
	Passenger Km. (NS) (Lakhs)	1100	1669	+ 25%
	Passenger Km. (BGMS) (Lakhs)	-	1578	-
	Seat Km. (BGMS) (Lakhs)	-	2484	-
	Passenger Km. per Seat (NS)	35358	70750	+ 100%
	Passenger Km. per Coach (NS)	-	12,73,500	-
	Occupancy Ratio Passenger Km./ Seat Kilometer (BGMS)	-	.635	-
I	No. of Seats (NS)	60492	90,911	+ 50%
	Passenger Km. (NS) (Lakhs)	14442	23,373	+ 62%
	Passenger Km. (BGMS) (Lakhs)	-	19148	-
	Seat Km. (BGMS) (Lakhs)	-	41807	-
	Passenger Km. per Seat (NS)	23874	25709	+ 8%
	Passenger Km. per Coach (NS)	-	9,25,529	-
	Occupancy Ratio (BGMS) Passenger Km./ Seat Km.	-	.458	-



III. No. of Seats (NS)	11,49,667	13,47,633	+ 17%
Passenger Km. (NS) (Lakhs)	6,25,012	9,66,695	+ 55%
Passenger Km. (BGNS) (Lakhs)	-	6,43,169	-
Seat Km. (BG NS) (Lakhs)	-	7,27,651	-
Passenger Km. per Seat (NS)	54,364	71,732	+ 31%
Passenger Km. per Coach (NS)	-	57,38,560	-
Occupancy Ratio ( <u>Passenger Km.</u> ) (BGNS)                      Seat Km.		. 884	-

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Table 4

Allocation of Cost of Repairs, and Maintenance, Class wise - 1971-72  
(All India Broad Gauge)

	AC	I	II	III	Total
Capital Cost per Coach (Lakh Rs.)	3.0	2.65	2.10	2.30	
No. of Coaches	109.3	2695.09	610.2	12046.5	15461.9
Total Capital Cost (Lakh Rs.)	327.9	7144.01	1281.4	27706.9	36460.3
Total Maintenance Cost @ Rs. 11,382.56 per Coach (Lakhs Rs.)					1759.96
Ratio of Maintenance Cost to total Capital Cost					2.4135%
Maintenance Cost per Coach Rs.	14,482	12,792	10,136	11,102	

TABLE - 5.

Cost of Providing Bedding per A C Coach for 1971- 72.

Basis: Cost per passenger originating is Rs. 5, as it is being charged at this rate from a first class passenger availing of this service.

No. of Passengers originating during the year 2,93,500

Total Cost = 293500 X 5 = 14,67,500

Total No. of AC Seats	...	....	...	2359
Equivalent Number of Coaches	....	....	...	$\frac{2359}{18} = 131$
Cost per Coach year	....	....	...	$\frac{14,67,500}{131} = 11,207$

Table 6

Total Common Expenses for All Passenger Coaches - 1971-72.  
(for All India, Broad Gauge Only)

	Rs.
Total Expenses on Coaching during the year	2,96,93,08,000
Total No. of Coaches	16543
Total No. of Passenger Coaches	14501
Total Expenses on Passenger Coaches = $\frac{14501}{16543} \times 2,96,93,08,000$	
	= 2,60,27,88,811

Variable Expenses for all AC Coaches

$$1,30,044 \times 109.3 = 1,42,13,809$$

Variable Expense for All I Coaches

$$51,292 \times 2695.9 = 13,82,78,103$$

Variable Expenses for All II Coaches

$$39,501 \times 610.2 = 2,41,03,510$$

Variable Expenses for All III Coaches

$$42,567 \times 12046.5 = 51,27,83,366$$

Total Variable Expenses

68,93,78,788

Total Common Expenses

= 1,91,34,10,023



Table 7

Effective Weight per Coach Class-wise 1971-72

(In tonnes )

	A C	I	II	III
Max weight per coach	46.5	39.0	38.0	37.0
Weight of Passenger and <sup>1</sup> Luggage allowed	1.5	1.8	0.9	6.7
Equivalent weight for the <sup>2</sup> power consumed by generator	9.0	1.5	1.5	1.5
Total	57.0	42.3	40.4	45.2

1.

Average Weight per passenger (Kg.)	60	60	60	60
Luggage allowed per passenger (Kg.)	70	60	40	35
Total Weight per passenger and allowed luggage (Kg.)	130	110	100	95
Average occupancy ratio per seat.	0.636	0.452	0.160	0.884
Seats per coach	18	36	54	80
Average passenger per Coach	11.40	16.5	8.64	70.7
Weight per Coach (Tonnes)	1.5	1.8	0.9	6.7

2.

Capacity of Generator	1Kw	3Kw	3Kw	3Kw
Power Consumed @ 90% Efficiently	27HP	4.5HP	4.5HP	4.5HP
Average Equivalent Weight in tonnes	9	1.5	1.5	1.5



Table 8

Allocation of Common Expenses - Class-wise per Coach 1971-72 (for All India Broad Gauge)

	<u>A.C.</u>			<u>Total</u>		
	<u>I</u>	<u>II</u>	<u>III</u>	<u>I</u>	<u>II</u>	<u>III</u>
<u>Effective Weight per Coach (Tonnes)</u>	57.0	42.3	40.4	45.2		
	109.3	2,695.9	610.2	12,046.5		
<u>No. of Coaches</u>						
<u>Total Weight (Tonnes)</u>	6,230.1	1,14,036.6	24,652.1	5,44,501.8		
<u>Total Common Expenses (Rs)</u>						
<u>Common Expense per Coach (in proportion of their weight)</u>	1,58,198	1,17,399	1,12,126	1,25,448		

6,89,420  
1,94,34

Table 9

Operating Cost per Coach (for All India Broad Gauge only)  
-----1971-72-----

	----- I -----	----- II -----	----- III -----
Capital Cost per Coach	3.00		
Air conditioning Equipment	2.65	2.10	2.30
(in Lakh Rupees)	2.00		
-----			
1. Depreciation			
a) On Coach @ 4 1/2%	14,000	11,925	9,450 10,350
B) On Air Conditioning			
Equipment @ 12 1/2	25,000	-	-
2. Interest on Capital @ 6%	30,000	15,900	12,600 13,800
3. Repairs and Maintenance			
(Mechanical)	14,482	12,792	10,136 11,102
4. Electrical Expenses	32,000	7,315	7,315 7,315
5. Cost of Attendant			
@ Rs. 200/- p.m.	3,360	3,360	-
6. Cost of Bedding	11,202	-	-
-----			
Total Variable Expenses	1,30,044	51,292	39,501 42,567
Total Common Expenses	1,58,198	1,17,399	1,12,126 1,25,448
-----			
Total Expenses per Coach	2,88,242	1,68,691	1,51,627 1,68,015

TABLE NO. 10.

Cost and Revenue class-wise as per Passenger (For All-India Broad Gauge, and Non Suburban only)

	I	II	III	Ord.	M/E	Ord.	M/E	Ord.
Operating Cost per Coach	2,88,242	1,68,691	1,51,627	1,68,015				
Passenger K. (000) during the year	15,77,73	3,28,07,12	1,29,14,96	86,03,37,57				
No. of Coaches	109.3	2695.9	610.2	12016.5				
Passenger Km. per Coach (000)	1443.5	1216.9	2116.5	7141.8				
Cost per 100 Passenger Km. (Rs.)	19.97	13.86	7.16	2.35				
Average Km. per Passenger Cost	569	418	371	61	261	58		
Cost per Passenger originating	113.63	57.93	26.56	4.37	6.13	1.25		
Fare Charged per Passenger for average K.M. travelled	135.45	49.35	26.25	5.25	9.55	1.60		
Surplus/Deficit	+ 21.82	- 8.58	- 0.31	+ 0.88	+ 3.42	+ 0.35		
%age surplus/Deficit	+ 19.2%	- 14.8%	- 1.2%	+ 2.0%	+ 55.8%	+ 23.0%		



Table 11

Cost of Reservation for Upper and Lower Classes  
at Delhi and New Delhi.

	<u>Upper</u> <u>A.C.I</u> <u>Rs.</u>	<u>Lower</u> <u>III</u> <u>Rs.</u>
Telephones	15,375	16,000
Cost of Teleprinter @ 50% of the Total	21,250	-
Staff	53,550	74,782
	<u>93,175</u>	<u>90,782</u>
No. of Seats/Berths reserved per month	<u>90,520</u>	<u>2,90,490</u>
Cost per reservation	1.03	0.31
Cost of Stationery	0.01	0.01
	<u>1.04</u>	<u>0.32</u>
Overheads including buildings, supervision etc., say 40%	<u>0.42</u>	<u>0.13</u>
Total per Seat Reserved	<u>1.46</u>	<u>0.45</u>
Charges per reservation	<u>1.00</u>	<u>0.50</u>
Revenue per reservation	<u>(-)0.46</u>	<u>(+) 0.05</u>

